

One Plan Case Study Project

Integrated Contingency Planning and Pollution Prevention

Preliminary Report

December 16, 1999

Report produced by:

Rick Reibstein, Massachusetts Office of
Technical Assistance

Stephen George, Massachusetts Office of
Technical Assistance

With

Len Wallace IV, U.S. EPA

Jeffrey Mosholder, HRP Associates

Mark Herbert, Franklin Paint Company

Andy Irwin, Irwin Engineers

Michael Cocco, Eastern Etching and
Manufacturing



**Massachusetts
Office of Technical Assistance
for Toxics Use Reduction (OTA)**



**U.S. Environmental Protection
Agency
(EPA)
Region 1**

Acknowledgements

The One Plan Case Study report was produced as part of the One Plan Case Study Project (“Project”), a joint effort between the Massachusetts Office of Technical Assistance (OTA) and the U.S. Environmental Protection Agency (EPA) Region 1 office.

This project was managed by Rick Reibstein (OTA Assistant Director) with Stephen George (Project Coordinator), Rich Bizzozero (Technical Assistance Team Leader), Alan Buckley (Technical Assistance Team Leader), Susan Leite (Technical Assistance Team Member), and Kelley Cronin (Technical Assistance Team Member).

Participating on behalf of EPA were Len Wallace IV (EPCRA Team Member) and Dwight Peavey (EPCRA Team Member).

The project would not have been possible without the involvement of the model companies, Franklin Paint Company and Eastern Etching and Manufacturing, and the assisting contractors, HRP Associates, Inc. and Irwin Engineers, Inc. Both companies and contractors dedicated tremendous time and effort into ensuring that the goals of the project were achieved and that the highest quality standards were met.

Preliminary Report: One Plan Case Study Project

Integrated Contingency Planning and Pollution Prevention

Introduction

The “One Plan Case Study” project is an effort to identify and promote the inherent benefits of the National Response Team’s integrated contingency plan (ICP, or “One Plan”) guidance^{1,2} and provide a useful model for facilities to use when developing their own integrated plans. The project places an emphasis on the use of pollution prevention as a primary means of reducing or eliminating sources of risk. The ICP framework presents an excellent platform for incorporating prevention into emergency response planning, by centralizing the planning process and encouraging a broader, facility-wide approach, as opposed to a process-specific focus. Cooperation and partnership with Local Emergency Planning Committees (LEPCs) is also stressed throughout the project, to ensure that local response needs are met and that an effective relationship between facilities and LEPC officials is established.

The two case studies profiled in this report document the development of One Plans for a small paint manufacturing facility and a medium-sized metal finishing operation. Each plan was developed with the assistance of a special contractor, under the guidance of the Massachusetts Office of Technical Assistance (OTA) and the U.S. Environmental Protection Agency (EPA) Region 1 office (which also provided funding for the project).

Selection of Model Companies and Contractors

To select the two model companies, a solicitation was sent to facilities that had previously worked with OTA, thereby ensuring that the applicants would be familiar with OTA and with the concept of pollution prevention. The two companies selected contrasted in their existing emergency planning preparedness and in the relative complexity of their operations. Both companies had exemplary working relationships with OTA, including a history of pollution prevention implementation and a willingness to share information and cooperate with OTA staff.

Once the two model companies had been chosen, OTA posted an RFR for the plan development and coordination services needed to produce the integrated contingency plans. Two separate contractors were selected, based on their considerable experience in developing integrated plans and their demonstrated understanding of how prevention principles can strengthen traditional emergency planning efforts.

¹ Published in the June 5, 1996 *Federal Register*.

² Briefly, the NRT guidance authorizes facilities to streamline multiple emergency response planning requirements by folding them into one comprehensive plan. The basic components of the integrated contingency plan are: a Core Plan outlining facility procedures for incident response; and eight specific annexes providing supplemental information.

Development of One Plans

Each pairing of model company and contractor worked closely to develop their respective integrated contingency plan. While much of the technical and regulatory expertise came from the contractors, the model companies were responsible for ensuring that the integrated plan met their emergency response needs and goals. OTA and EPA reviewed each plan for compliance and consistency with the goals of the One Plan Case Study project (prevention, partnership with LEPC). After follow-up discussions with the respective contractors and companies, final versions of the One Plans were produced and sent to the companies for implementation.

The One Plan Case Study Project Report

This One Plan Case Study project report is important to company managers, safety and environmental coordinators, other facility personnel, LEPC officials and members of the public interested in reducing risk and improving emergency response at local facilities.

The case studies provide a narrative of how each One Plan was developed. Together with the two model plans developed as part of this project, they offer a comprehensive resource to help facility planners construct their own integrated plans. None of this material is intended to serve as a template – as the considerable contrast between the two models demonstrates, each One Plan must be designed to meet the individual needs of the facility. The case studies are also intended to illustrate the benefits of plan integration and the importance of reducing or eliminating sources of risk through prevention. In addition, they serve as useful references for developing plans that meet all the relevant compliance provisions.

The “Lessons Learned” sections summarize many of the changes implemented by each company as a result of the project and provide a number of helpful tips for developing integrated plans. The “Evaluation” sections note comments from the project managers (OTA and EPA). Finally, the “Contrast” section that wraps up the case study portion of this report addresses interesting differences between the two models.

This is a preliminary report, documenting the development of the One Plan case studies and model plans. A final project report will be produced following workshops held across Massachusetts for facilities and local officials. This final report will reflect the feedback received at these workshops, and recommendations on how the One Plan project information should be utilized by facilities, emergency response officials, and other interests.

If you have any questions, or are interested in finding out more about the One Plan Case Study project, please contact Stephen George, OTA Project Coordinator, at (617) 626-1094 or at stephen.george@state.ma.us. For specific information concerning the integrated

One Plan Case Study
December 16, 1999

contingency plan framework, you may contact Len Wallace IV, U.S. EPA Region 1 EPA Right-to-Know Team, at (617) 918-1835 or at wallace.len@epa.gov.

Case Study #1: Franklin Paint Company, Inc.

Background

The Franklin Paint Company is a privately-owned manufacturer of traffic paint located in Franklin, MA. The company currently employs 18 people and operates one shift a day, Monday through Friday. Operations are housed in a three-story brick mill building, with a storage building and a number of small ancillary buildings also on the property. Neighboring properties include a mill building converted into a shopping mall, a freight rail spur used periodically to offload materials to Franklin Paint and other facilities, and an oil storage facility. The local watershed drains into the Charles River.

Franklin Paint blends and packages three basic traffic paint products: water-based paint, solvent based paint, and thermoplastic. The blending operations mix various liquid and powder ingredients, including a number of solvents, alkyds, and latex. Liquid ingredients for each product are piped directly from storage tanks into the mixing vessels, where any dry ingredients are added and mixed. Paint products are packaged into 5-gallon cans or 300-gallon steel totes, and thermoplastic products are packaged into 50-lb. paper bags. There is little waste, apart from used packaging materials, since leftover product is recycled back into the production line.

Management consists of the owner/operator who handles finances, marketing and regulatory compliance, a facility manager responsible for most of the company's day-to-day manufacturing operations, and an office manager. The company was selected to participate in the One Plan program based on its strong working history with the Massachusetts Office of Technical Assistance (OTA) and demonstrated willingness to achieve compliance with state and federal regulations.

One Plan Development

Prior to beginning the One Plan project, Franklin Paint had little in the way of formal emergency response planning or employee training. The contractor, HRP Associates, Inc., worked from existing air source permitting materials and other information provided by Franklin Paint management to develop the facility's integrated contingency plan.

An initial walkthrough of the facility was conducted by Franklin Paint management to orient HRP, the local fire department and the Town of Franklin LEPC³ to the company's operations, and to get a sense of the basic emergency response issues that the One Plan would have to address. Based on this simple audit, the group determined that Franklin Paint is subject to U.S. EPA Spill Prevention Control and Countermeasures (SPCC) planning requirements⁴ (for above-ground storage of >660 gallons of petroleum products)

³ For the purpose of the case study project, OTA and EPA also participated in this and subsequent walkthroughs.

⁴ 40 CFR 112.1-112.7

and OSHA Process Safety Management and Emergency Action requirements⁵ (for above-ground storage of roughly 60,000 gallons of flammables).

HRP and the company then followed up with a second, more detailed audit of Franklin Paint's operations in order to develop a comprehensive hazard analysis. The major facility hazards stem from the storage of 60,000 to 70,000 gallons of Class 1B flammable liquids in above-ground tanks within the main building. These flammable materials include acetone, heptane, methanol, alkyds, toluene, and xylene. Other hazards identified during the second audit included: insufficient containment around some storage tanks, the use of a rail spur adjacent to the property for unloading liquid ingredients from tanker cars, inadequate worker protection near mixing vessels, some unlabeled piping, and the language difference between management and some of the facility staff.

With the above hazards identified, it was determined that fire/explosions and spills (in the facility and during material transfer) were the main concerns at the facility. Because the company only mixes and packages its paint products, the actual operations are fairly simple and pose little risk. It was noted that the facility has no history of serious incidents.

The next step was to determine the level of response that could be handled by in-house personnel, and at what point outside emergency response would be required. Franklin Paint lacks the necessary time and resources to adequately train employees in advanced emergency response, as required under the OSHA HAZWOPER (Hazardous Wastes Operations and Emergency Response) standard⁶. The company and HRP determined that employee response should be limited to those activities allowed under the more basic Hazard Communication⁷ guidelines, such as dousing incipient fires with extinguishers and containing small, less harmful spills with available diking and boom materials.

An Emergency Coordinator and alternate were selected based on their knowledge of the facility and bi-lingual skills. The EC's responsibilities include assessing each incident and determining whether in-house response is sufficient or if evacuation and outside emergency response are required. In the latter case, the EC is also responsible for ensuring safe evacuation and facilitating external response.

Per the One Plan Case Study project guidelines, an emphasis was placed on working with the Local Emergency Planning Committee (LEPC) – in this case, the local Fire Department. Franklin's local emergency response capacity is limited, and the town has no certified⁸ community emergency response plan. Local officials clarified that, in the case of a serious fire or explosion, the only response option was to evacuate the facility and simply try to control the burn. Serious spills would require contacting the regional Hazardous Materials response team, located roughly a half-hour away from the facility,

⁵ 29 CFR 1910.119 and 1910.120

⁶ 29 CFR 1910.120

⁷ 29 CFR 1910.1200

⁸ by the Massachusetts State Emergency Response Commission (SERC)

in addition to the notification of the Massachusetts Department of Environmental Protection (DEP) emergency response team as required by law.

Prevention

Because Franklin Paint and the local community lack any significant response capacity, the company has a strong incentive to identify and implement effective preventive measures. HRP worked with the company to develop a hazard analysis matrix, listing the source and nature of potential hazards at the facility. For example:

<i>Location:</i> Plant 1 st floor	<i>Material:</i> Acetone 1-6,500 gallons	<i>Potential failure:</i> Tank failure Spill during transfer	<i>Potential volume:</i> 3,000 gallons 5-30 gallons	<i>Flow direction:</i> Retained - concrete floor, sidewalls To paved parking area on NW side of building
--	--	--	---	---

This matrix, included in Annex 7 (Prevention), is accompanied by explanations of preventive or containment measures intended to reduce the potential for such risks. Where the company has not yet implemented the necessary measures, these explanations note what steps have been planned. By regularly updating Annex 7 to reflect current operations, Franklin Paint will be able to easily identify opportunities for additional pollution prevention efforts as practices change. This system also ensures the continuation of prevention planning through any company staff and management changes.

The company quickly implemented a number of preventive measures as a result of the One Plan development effort, including:

- Limited ignition sources (e.g. welding, smoking, etc.) to areas where flammable liquids are not stored or used.
- Increased ventilation in areas where flammables are stored/used to prevent accumulation of flammable gasses.
- Ensured that all tanks/containers containing flammable liquids remained closed when possible.
- Inspected tanks/containers and piping for leaks.
- Moved cleaning of totes/containers that contain flammables or that are cleaned with a flammable liquid to a ventilated area designed for this purpose.
- Fitted all storage tanks with appropriate level indicators, alarms, and valves to prevent overfilling or accidental release during transfers.
- Initiated housekeeping measures to prevent the accumulation of combustible material such as cardboard or paper.
- Added secondary containment around each storage location to prevent the spread of flammable liquids in the case of an accidental release.
- Trained employees in appropriate emergency response practices, including identification of emergencies and notification protocols.
- Established clear protocol for reporting accidents.

In addition, Franklin Paint has been actively pursuing methods to reduce the volume of hazardous materials used on site, such as the petitioning of local and state agencies to change their traffic paint specifications from solvent-based to water-based paints.

Lessons Learned

The One Plan project prompted Franklin Paint to institute a number of changes. The effort also highlighted certain techniques that can strengthen emergency plans for very small companies:

- A different approach to emergency planning – The process of developing the One Plan encouraged Franklin Paint to evaluate its operations on a broader, facility-wide basis, rather than addressing each potential hazard in a piecemeal approach. In this case, a lot of the improvement came simply from considering risk reduction issues for the first time, as Franklin Paint had little in the way of formal emergency response planning experience prior to the One Plan project. The comprehensiveness and breadth of the company's One Plan development effort was benefited by the participation of various organizations, including HRP, the local fire department, the Massachusetts Division of Occupational Safety⁹, and the case study project managers (OTA and EPA). Whether or not companies choose to develop the One Plan with a contractor, it is essential that local responders and other involved interests participate in the process.
- Incorporation of hazard analysis into emergency response planning – Hazard analysis proved to be an invaluable exercise for Franklin Paint. The process raised a number of concerns that had not previously been addressed by the company, such as chemical storage containment and the relationship between flammable materials and sources of ignition. It also helped the company and HRP improve compliance and develop viable prevention strategies to reduce or eliminate sources of risk, in many cases by implementing simple, low-cost measures¹⁰.
- Delineation between internal and external response – Franklin Paint's integrated plan spells out what actions may be taken by facility staff (based on Hazard Communication parameters), and at what point and in what manner staff should integrate and support the incident command of local response officials. The company's One Plan does not assume local responders are equipped to handle all types of emergencies, particularly those involving hazardous or extremely hazardous materials. Such limited response capabilities made implementation of prevention wherever possible absolutely paramount.

⁹ In Massachusetts, DOS is mandated to implement the federal Occupational Safety and Health Administration's (OSHA) consultation program, which provides free assistance with identifying health and safety compliance issues and some enforcement leniency for facilities that rectify any non-compliance issues within a set time schedule.

¹⁰ For example, the construction of permanent berms around storage tanks and the establishment of clear guidelines for material loading and transfer.

- Simplified compliance – In terms of compliance, the development of a One Plan allowed Franklin Paint to simultaneously meet a number of emergency planning requirements without expensive and time-consuming duplication of effort or conflict between individual emergency response plans. The single plan has also proven helpful to the community LEPC, which does not have the resources to generate the kind of easy-to-use mapping and hazard assessment information provided in the plan.
- Improved compliance – The process of developing the One Plan identified a handful of noncompliance issues at Franklin Paint associated with EPCRA reporting, SPCC planning, and lab safety planning. The company self-reported under the EPA Small Business Policy and the OSHA Consultation Program, thereby qualifying for some enforcement mitigation (such as no past liability for reporting and planning noncompliance) and a time allocation in which to comply.
- Identification of other environmental, health and safety issues – The comprehensive review of Franklin Paint's entire operations by not just company staff but also various outside interests unearthed a handful of non-emergency response related issues. For example, a set of abandoned transformers were discovered along the side of the main building, which Franklin Paint quickly had tested and removed by the electric company. The company's practice of storing recyclable metal paint containers outside was changed, to prevent any leaching of paint and other contaminants into the local groundwater. Franklin Paint was able to take care of these problems as part of the company's ongoing risk reduction efforts.

Evaluation

The Franklin Paint Company case study demonstrates how the integrated contingency plan framework can help a company with little or no existing emergency response planning to quickly comply with relevant planning requirements.

Franklin Paint was receptive to recommendations from HRP, the program managers (EPA and OTA), Division of Occupational Safety advisors and the local fire department regarding compliance improvements, risk reduction opportunities, and key pollution prevention measures. A number of key changes, such as process adjustments and new containment measures, were implemented almost immediately.

The development of a comprehensive plan helped identify gaps in Franklin Paint's compliance. The streamlined framework, where everything is contained in one document and there is no longer any repetition between various plans, made achieving compliance with those measures still outstanding at the company a much easier task than it might have been with multiple plans.

The company's in-house emergency response is fairly basic, limited to activities authorized under Hazard Communication and SPCC plan parameters. This allows the

Core Plan of the integrated contingency plan to remain simple and streamlined. The Core Plan appropriately addresses in-house response only, and refers to the LEPC Plan for external response procedures. Although at the time of plan completion the local community lacked a real LEPC Plan, this shortcoming was expected to be rectified under Massachusetts emergency response improvement efforts.

Earlier drafts of the company's integrated contingency plan provided helpful hazard identification and analysis, but failed to note existing or potential prevention measures to help reduce or eliminate these sources of risk. The final plan includes all of this information in Annex 7 (Prevention).

Prevention is absolutely paramount for a short-staffed facility like Franklin Paint that has large volumes of dangerous chemicals stored and used on-site. With little recourse in the case of a serious spill, fire or explosion, as facility like Franklin Paint must make every effort to identify opportunities for toxics use reduction, pollution prevention, safety improvements, and minimization of risk.

Case Study #2: Eastern Etching and Manufacturing, Inc.

Background

Eastern Etching and Manufacturing (EEM) is a small, privately held metal etching company established in 1935. The facility, which employs 125 people, is located in Chicopee, MA between the Chicopee River and Chicopee Canal. Neighboring properties include both residential and commercial, including four schools within a .5 mile radius of the facility.

The company manufactures nameplates and decals using a variety of metals, including aluminum, brass, photosensitive aluminum, and stainless steel. Incoming sheet metal is mechanically surface-treated and washed with aqueous alkaline cleaners. Once washed, the metal is transferred to masking operations where designs are applied using silk screen or lithographic imprinting. Prepared sheets are fed into one of two etching lines, both of which use strong acids such as ferric chloride and hydrochloric. After etching, sheets may be spray painted or go straight to a low-flash V&MP naptha cleaning process to strip off masking material. A final process stamps, drills or burnishes the parts before they are shipped as finished goods.

Because the etching and solvent cleaning operations generate moderate quantities of hazardous waste, EEM is regulated as a large quantity generator (LQG). Etching solutions are considered to be corrosive wastes and the naptha is treated as flammable. The quantities of acids and solvent used require annual reporting under Emergency Planning and Community Right to Know (EPCRA)¹¹. Air emissions are below major source thresholds and are subject to state permitting requirements. Stormwater runoff discharges to the nearby Chicopee River and is subject to a National Pollutant Discharge Elimination System (NPDES) multi-sector general permit. The facility pre-treats industrial wastewater prior to discharge to the Chicopee River.

EEM has a full-time Safety Coordinator (also the company's Environmental Director) who reports directly to the company president, and who has worked closely with both OTA and the Toxics Use Reduction Institute (TURI). The company has a strong pollution prevention history, including investigation of alternatives to V&MP naptha and the automation of its aluminum etching line. In addition, the current owner is extensively involved in the community.

¹¹ 40 CFR Parts 350-372

One Plan Development

Prior to the One Plan project, EEM had well developed environmental and emergency planning compliance programs in place, including:

- Hazardous Waste Personnel Training Plan,
- Emergency Response and Action Plan (Hazardous Waste Contingency Plan and OSHA Emergency Action Plan),
- Hazard Communication Program
- Respirator Use and Maintenance Program, and
- Toxic Use Reduction Plan.

EEM's preparation allowed the contractor, Irwin Engineers, Inc., to fold the plans together into a single integrated plan with minimal additional input. Much of the effort was dedicated to strengthening EEM's emergency planning and management practices.

The initial tour of the facility included Irwin Engineers, EEM's Safety Coordinator, EEM's primary Emergency Coordinator, representatives from the local fire department and the Town of Chicopee LEPC¹². This first session also included a discussion of the potential risks and the basic emergency planning concerns faced by the facility, the role of prevention, and the importance of working directly with local emergency responders. The project managers (EPA and OTA), along with the contractor and Safety Coordinator also met with the company president to explain the project goals and ascertain the involvement of senior management. These meetings put everyone on the same page and helped facilitate plan development efforts.

Other interests were contacted and oriented to the facility and its operations during the plan development process, including the company's emergency response contractor (who had not reviewed the facility in several years) and the local Conservation Commission.

To develop the One Plan, Irwin Engineers and EEM chose to start with Annex 8, the regulatory cross-matrix that links each element of the integrated plan to the individual regulatory requirements. By beginning with a look at all the possible compliance issues, the contractor identified which were applicable to EEM and disregarded those that were not relevant. This helped them lay the groundwork for developing the integrated plan.

¹² For the purpose of the case study project, OTA and EPA also participated in this and subsequent walkthroughs.

A formal hazard assessment for the facility was conducted, building on the information generated during the initial walk-through. The assessment, which is included in the One Plan under Annex 3 (Response Management System), provides a detailed review of all potential hazards present at the facility, an analysis of vulnerable receptors (e.g. workers, the general public, and environmentally sensitive areas), and containment and accident prevention measures for each potential hazard, such as:

Paint and Thinner

Paint and paint thinner are stored outside inside a shed located along the southern boundary.

Outside Shed – 500 gallons

Surface under storage: Cement floor

Service: Painting

Type and Construction of Containers:	55-gallon steel drums
	5 gallon steel containers
	5 gallon plastic containers

Maximum release: 500 gallons

Overfill Protection: Visual supervision of loading. EEM employee and delivery driver maintain visual and voice contact during loading procedures.

1st Defense: Enclosed in a building

2nd Defense: Cover catch Basins #4 and #7. Catch basin #4 discharges to the Chicopee River. Catch basin #7 is a dry well. Catch basins are covered during deliveries and pickups.

Finally, probable-case and worst-case scenarios for each major hazard are analyzed. Together, this section specifies the information EEM will use to identify, prioritize and evaluate preventive opportunities (see “Prevention”).

The hazard assessment was developed with assistance from various outside sources, particularly Irwin Engineers, as well as local response officials and the project managers (OTA and EPA). Information on nearby vulnerable receptors was drawn from Chicopee's LEPC plan. The company was compelled to re-evaluate some of its evacuation and response programs to take these neighbors into account.

Following the hazard assessment, the contractor and EEM worked together to identify opportunities for reducing or eliminating risks through preventive strategies. As with the hazard assessment, this broadened the company's perspective beyond a process-specific approach and prompted a consideration of how practices in one area of the plant could create risk elsewhere down the line. The Safety Coordinator noted that, while EEM has a long history of toxics use reduction planning, this was the first time that prevention principles were utilized as a means of problem solving (see "Prevention" for more information).

The regulatory cross-matrix, the hazard assessment and the prevention assessment essentially dictated the scope of the Core Plan, which is the centerpiece of the One Plan. Irwin Engineers developed a single incident response and command protocol applicable to all potential emergencies that also met the company's relevant compliance obligations. This protocol adopts the procedures already established under the company's individual emergency response plans, and succeeds in resolving conflicts that had persisted between

the separate plans. In the Core Plan, modified versions of this protocol are provided for each type of incident forecast by EEM (ranging from fire or spill to health emergency).

A key feature incorporated into the Core Plan was a notification and response level flowchart providing incident command information, internal and external contacts, and steps for addressing each type of incident. The flowchart serves as a quick reference for finding incident-specific procedures elsewhere in the Core Plan. The response levels (i.e. varying degrees of response based on the nature of an incident) reflect specific nomenclature employed by the local Fire Department for its own response actions, thereby facilitating communications between EEM's Emergency Coordinator and the Fire Department and avoiding misinterpretation. This interaction with local response officials is extremely important when developing a facility response plan.

Prevention

Since two solvent fires occurred in the 1970's, EEM has benefited from a number of preventive measures, and has had no other major incidents. A handful of smaller episodes have been managed by the facility emergency response team, without any releases to the environment.

In developing the Prevention portion of the integrated plan, EEM found that pollution prevention provided the company with new problem solving techniques, and encouraged a revamping of incident planning and response policies. Moving beyond standard clean-up and repair measures, EEM and the contractor established a management system to guide periodic review of the facility's operations and evaluation of any pollution or risk prevention opportunities.

This management system joins together pre-existing company programs (emergency planning, toxics use reduction, operations and maintenance review) under a clear hazard prevention methodology. It gives priority to "high hazard" chemicals and processes, and establishes a number of pollution prevention tools for the company to use, including input substitution, process modifications, and preventative maintenance. Basic performance metrics, including air emissions, hazardous and non-hazardous waste generation, water and energy consumption, and the on-site storage and use of "high hazard" chemicals are used to help the company evaluate pollution prevention options. The system allows the company to learn from past incidences through detailed root cause analysis.

Lessons Learned

The One Plan project yielded a number of lessons learned and opportunities to strengthen and improve EEM's emergency planning and response programs. It also proved to be a useful example of how a new framework such as the One Plan can be adopted by a facility with long-standing response and management practices.

The process encouraged the company to adopt several changes to its existing management and operations, including:

- A shift in emergency planning perspective from compliance to hazard prevention – Previously, EEM had developed the necessary emergency response plans focused primarily on compliance, with very little consideration for anything beyond regulatory standards. Producing a single response plan that addresses all aspects of the company's operations encouraged EEM to focus more on potential hazards, their impacts on the community, and the means available to prevent them. This was the first time the company had dedicated significant emergency planning effort to issues outside of the facility's internal operations.
- Improved communication with local responders, third-party responders, and local community organizations – The company took a more proactive approach in working with outside interests to ensure advanced coordination and to solicit their assistance with reducing risk. Diverse external feedback prompted EEM to consider a broader range of issues than it might otherwise have focused on in order to meet compliance standards.
- Re-evaluation of internal and external response capabilities and coordination, including authorization and notification – Developing the incident response and command structure in the Core Plan prompted EEM to clarify the specific roles for facility and outside response personnel.

The following are important tips the company learned to help facilitate integrated plan development for facilities as complex as EEM:

- The service of an outside contractor experienced in emergency planning is worthwhile. The different perspective may help uncover new compliance issues, prevention opportunities, or other program improvements. However, the company should not expect to divest itself of all responsibility for developing the integrated plan. The principles and priorities of the integrated plan must come from the company, starting at the senior management level.
- Having existing plans prepared and ready for review, and providing them in both print and electronic copy allows the contractor to easily assess any additional development needs (via a gap analysis between existing plans and regulatory requirements) and incorporate materials into the integrated plan without having to re-create documents. It is also important to date all planning components to ensure future revisions are incorporated properly by all plan users (including external responders).
- The company should regularly orient outside contractors, hazmat teams, LEPCs and local responders to the facility, particularly after significant process or layout changes. If appropriate, feedback on minimizing risk should be solicited from these

outside interests, simply for the purpose of ensuring that all options are being considered.

- The Core Plan is essentially an executive summary of the plan annexes. By producing most of the annexed information first, EEM and the contractor were able to quickly pull together the Core Plan. This method also simplified the process of pulling together the Core Plan, by breaking it down into smaller pieces.
- It is important to coordinate facility response planning with the community LEPC Plan. The facility plan should reflect local response agencies' capabilities, authority, terminology and priorities. Working with the LEPC ensures that both parties are familiar with each other's response plans.
- Unified Command provides for coordinated effort between facility and local emergency response personnel. However, local response agencies have authority once they respond to an incident. The company's integrated plan should focus on internal response actions and only reference external response, which is detailed in the LEPC plan.
- Preparing the Core Plan response flowchart underlined the need for a Responsible Corporate Officer and Chief Financial Officer to be immediately notified in the event of an incident, in order to manage external communications and authorize necessary allocations by the Emergency Coordinator. This prevents a situation where contracted responders arrive but the EC is unable to authorize the expenditure necessary for them to take action.

Finally, the process of developing an integrated contingency plan helped increase EEM's awareness of some compliance and risk management issues. For instance, the facility was unaware that any trigger of the lower explosive limit meter requires a notification to DEP within two hours, even if there was no actual release to the environment.

Evaluation

The Eastern Etching and Manufacturing case study proved to be educational to both the project managers (OTA and EPA) and participants (EEM and Irwin Engineers), primarily because it involved making modifications to a well-established emergency response program and facility management plan.

All parties involved were pleasantly surprised by the number and character of immediate changes EEM was encouraged to take based on development of the integrated contingency plan (see *Lessons Learned* above for details). By forcing the company to evaluate the risk potential of its entire operations from a preventive – rather than strictly compliance – standpoint, a number of gaps in the existing emergency response plans were identified, as well as several new opportunities to strengthen and improve the company’s response program.

There was some resistance on the part of the company to listing proposed and/or non-compliance pollution prevention measures in Annex 7 of the integrated plan. By including specific reference to these measures, EEM was concerned that regulatory officials, local officials and the public might hold them responsible for implementing them, even if the company determined that they were not technically or economically viable. OTA believes that any discussion of “possible” measures would not create a liability for the company, and would only help demonstrate the company’s efforts to consider all possible prevention opportunities. The company eventually decided to use Annex 7 to focus on the mechanism with which prevention opportunities will be identified and evaluated, rather than citing specific measures.

EEM elected to keep its Hazard Communication and Hazardous Waste Management (RCRA) plans as separate components, rather than fold them into the integrated plan. The company uses these plans “on a day-to-day basis” and prefers having them easily accessible. EEM also noted that including them would also add unnecessary bulk and complexity to the plan. EPA did feel it was acceptable to keep the Hazard Communication plan separate provided that it designates the integrated plan as the training tool to be used to train employees in hazard response. EPA would have preferred to see the RCRA plan incorporated. EPA maintained that incorporating the necessary information into the integrated plan would add very little documentation, since many of the RCRA provisions are already met elsewhere in the integrated plan. The regulatory cross-matrix in Annex 8 can then be used to reference the specific page numbers where each applicable RCRA provision is addressed¹³. This was a good illustration of how the One Plan guidance may be modified to meet the needs of the individual company.

In the Core Plan, specific Massachusetts regulations (e.g. 310 CMR 40.0347) are cited in order to clarify that terms used in EEM’s plan (e.g. “reactive or explosive hazardous

¹³ Annex 8 is the primary tool that allows the One Plan framework to eliminate so much duplicative documentation. A complete and robust Annex 8 permits companies to mention a specific compliance action (for example, “covering storm drains”) only *once* in the text of the One Plan, and then link that action to the individual regulations to which it applies (SPCC, RCRA, Stormwater).

material”) match those used in the regulations. However, the citations’ purpose is not explicitly noted, nor are the regulations referenced in Annex 8. As a result, a regulatory official reviewing the document may not be able to determine whether the regulations cited in the text trigger a responsibility on the part of the company or are strictly for clarification. Designed properly, the One Plan can serve as an excellent compliance tool, it is best to avoid these types of misinterpretations.

The complicated nature of EEM’s operations, including etching, stamping, printing, and many other processes, prompted the company to include separate response procedures for varying types of incidents in the Core Plan. Also included is a large flow chart providing basic response and notification instructions for each type of incident, which allows facility personnel to quickly identify necessary response steps for any potential emergency. EPA favors a more streamlined approach, where the essential structure of the response procedures is provided once, and the individual differences are noted separately. This streamlined approach meets the basic criteria of the integrated plan, which is that of a quick reference cheat-sheet to help train staff prior to an incident, not a step-by-step manual to be used at the time of an incident. Such streamlining would shorten EEM’s Core Plan by several pages. However, EEM favors the separate discussion of emergency response for different types of incidences, for the basis of clarity.

In summary, the project managers gained valuable insight into how a company with established standard operating procedures and emergency response principles can use the One Plan framework to strengthen its program and comply with emergency response planning requirements. The model also helped demonstrate how a company’s planning strategy might differ from that of the National Response Team. The company used the One Plan project to simplify and improve compliance, further embrace prevention as a primary means of reducing risk and liability, and make operations and management more effective and wide-reaching. In a handful of cases, it elected to not follow the One Plan guidance to the letter, but instead modify the framework to meet the company’s specific management style.

Contrast

Two very different companies were chosen to serve as models for the One Plan Case Study project, which allowed a range of issues and perspectives to be profiled. The Franklin Paint Company, Inc. was chosen in part because it represents a small operation with limited staff and resources and very little in the way of existing emergency response planning. Eastern Etching and Manufacturing, Inc. was selected as a larger facility with a more organized and established emergency response coordination program.

The two contractors selected to work with the model companies, HRP Associates Inc. and Irwin Engineers Inc., each employed a slightly different approach to developing the integrated contingency plans, which helped add another level of contrast between the individual case studies.

The following are some of the major differences between the two case studies:

- Degree of preparation —
Franklin Paint: The company had little in the way of pre-existing emergency response plans prior to the Case Study project. HRP started essentially from scratch to build Franklin Paint's integrated plan, although the relative simplicity of the facility's operations made this a manageable task. The lack of existing framework and the company's flexible management style helped facilitate adoption of the new emergency response plan protocol and the accompanying prevention and communication practices. The process of developing the plan along with HRP helped bring the company's Emergency Coordinator up to speed, to the point where he is now more prepared to manage and update the One Plan as needed. The One Plan also helped Franklin Paint achieve compliance with relevant planning requirements.
EEM: The company already had individual plans from which to work in developing the integrated plan, although a handful of conflicts between plans had to be resolved. This allowed EEM and Irwin Engineers to focus more time and effort on the necessary management changes. In contrast to Franklin Paint, EEM's relative sophistication made it slightly more challenging to implement these changes, since it required making some alterations to long-standing management practices.
- Level of in-house response to incidents —
Franklin Paint: Due to the limited resources available for training and response equipment, Franklin Paint elected to restrict in-house response to those actions authorized under the Hazard Communication and SPCC programs (using fire extinguishers to control incipient fires, containment of minor spills). Incidents that demand a greater level of response will be handled by the local fire department. In-house staff will evacuate. It is assumed that, in the case of a fire, the only resort is for the fire department to let the facility burn.
EEM: The company has a designated in-house Emergency Response Team trained to respond to emergencies, as authorized under the more advanced Hazardous Waste Operations and Emergency Response (HAZWOPER) program. EEM is equipped to handle a large range of incidents in-house. For smaller incidents, local emergency

responders will be notified only for informational purposes. If a spill, fire or explosion exceeds the in-house team's capacity to respond, staff will evacuate the area or the entire facility if necessary and defer to external response personnel (fire department, spill contractor, etc.)

- Incorporation of separate planning elements into the integrated plan —
Franklin Paint: The company's individual emergency planning requirements are relatively simple, comprised of EPA's Spill Prevention Control and Countermeasures (SPCC), OSHA's Emergency Action and Process Safety Management (PSM) and a handful of other regulations. The contractor was able to include all the relevant planning requirements within the single integrated contingency plan.
EEM: A handful of emergency response plan elements, including the company's Hazard Communication program, are kept in separate plans and referenced within EEM's integrated contingency plan (see *EEM: Evaluation* for more information).
- Treatment of prevention within the integrated plan — The One Plan Case Study project placed a particular emphasis on the incorporation of prevention into the companies' emergency contingency plans, with the goal of reducing or eliminating pollution and health and safety risk.
Franklin Paint: The company and HRP inserted the entire pollution prevention component of the integrated plan into Annex 7 (Prevention). The section includes a comprehensive hazard analysis (provided in table format) of facility operations and storage areas. This analysis is accompanied by text explaining the company's existing and future plans to employ preventive measures to reduce or eliminate risk.
EEM: The company and Irwin Engineers elected to divide the pollution prevention component into existing and future prevention efforts. Existing prevention measures are included in Annex 3 (Response Management System) as part of a detailed, facility-wide hazard analysis. Future prevention plans are addressed in Annex 7 (Prevention) with a proposed management system, which establishes a methodology for facility managers to regularly review operations and evaluate potential pollution and risk prevention opportunities. Such a system helps to institutionalize prevention as a component of EEM's management decision making.